

DRAINAGE REPORT

TIN BARN BREWING, INC.

62 Kings Highway Bypass
Town of Chester
Orange County
New York



Date: 10/18/23
W.O. No. 1725.01

INTRODUCTION

This report addresses potential stormwater impacts from the site changes that have been constructed at the Tin Barn Brewing site, a 4.8-acre parcel located on the west side of the Kings Highway Bypass. More than 20 years ago, the Town of Chester approved a site plan for the Jenack Auction House, which was then constructed on the property. Since that time, various site changes have been made, including construction done by the current owners to expand parking areas and add outdoor facilities such as a stage and seating areas.

Runoff from the project site enters a swale along the railroad tracks adjacent to the property, which empties into the large wetland area located on the west side of the tracks. A stream flows from the wetlands in a northerly direction toward the Black Meadow Creek. As shown in Figure 1, the drainage area to the stream adjacent to the Tin Barn site is approximately 250 acres.

FLOW CALCULATIONS

The Hydraflow program, with the SCS Method, was utilized to compute peak discharges from the Tin Barn site based on two conditions:

- the Jenack site plan
- the current Tin Barn site plan.

The site layouts for the two conditions are shown in Figures 2 and 3. Land covers are shown in the figures and are listed in Table CN-1. The soils on the site are all classified as Hydrologic Soil Group D by the USDA mapping, as shown in Figure 4.

We have computed the following peak flows from the project site:

<u>Design Storm</u>	<u>Jenack Plan</u>	<u>Tin Barn Plan</u>	<u>Change</u>
2 year	9.7 cfs	10.6 cfs	+ 0.9 cfs
10 year	16.9 cfs	18.2 cfs	+ 1.3 cfs
100 year	33.8 cfs	36.1 cfs	+ 2.3 cfs

The results show that peak flows are slightly higher for the current Tin Barn plan in comparison to the previously approved Jenack plan. The calculations for the Tin Barn plan are conservative in that they do not account for the increased volume attained by the recent dredging of the detention basin located in the northwest corner of the site. The contractor estimates that he removed approximately 80 cubic yards of sediment and soil. This may have created a larger storage volume than was originally created during the construction of the Jenack plan.

In addition, the minor increases in peak flow generated from the property are mitigated by the following factors:

1. The project site is a small portion (approximately two percent) of the watershed area to the adjacent wetlands, and the applicant has modified a small portion of the project site.
2. The large wetland system provides significant storage and attenuation of runoff; the resulting increases in peak flow leaving the system will be much lower than the increases calculated for the project site alone.

Supporting data, including a printout of the Hydraflow results, are included at the end of this report.

WATER QUALITY MITIGATION

To improve the stormwater quality leaving the site, the Tin Barn owners have recently installed a storm drain filter in each of the six catch basins located on the site. These devices filter runoff from paved areas, removing soil, debris, and other pollutants prior to discharge from the site. Filter locations and details are provided on the site plans. The owners are responsible for maintaining the filters.

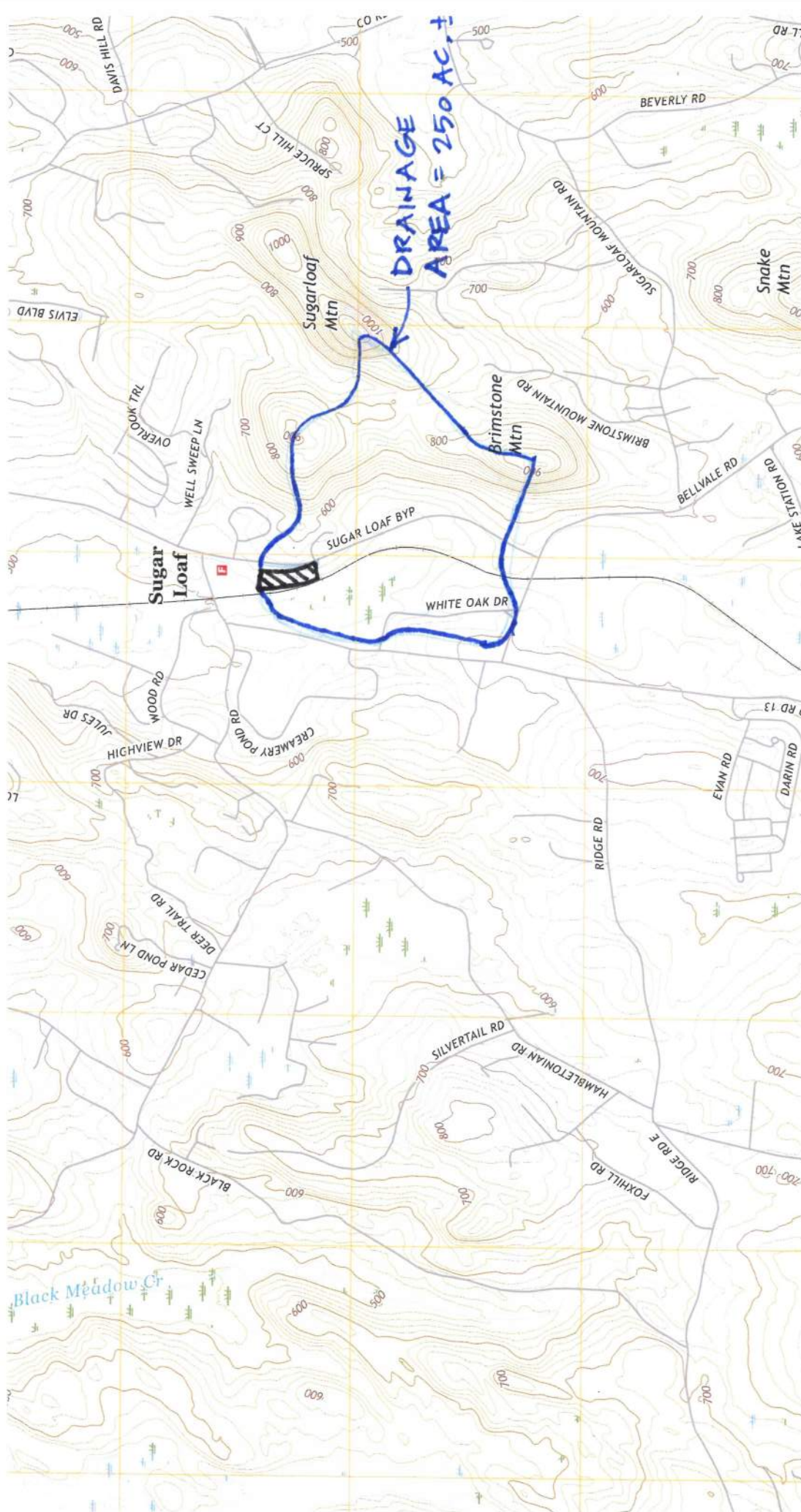
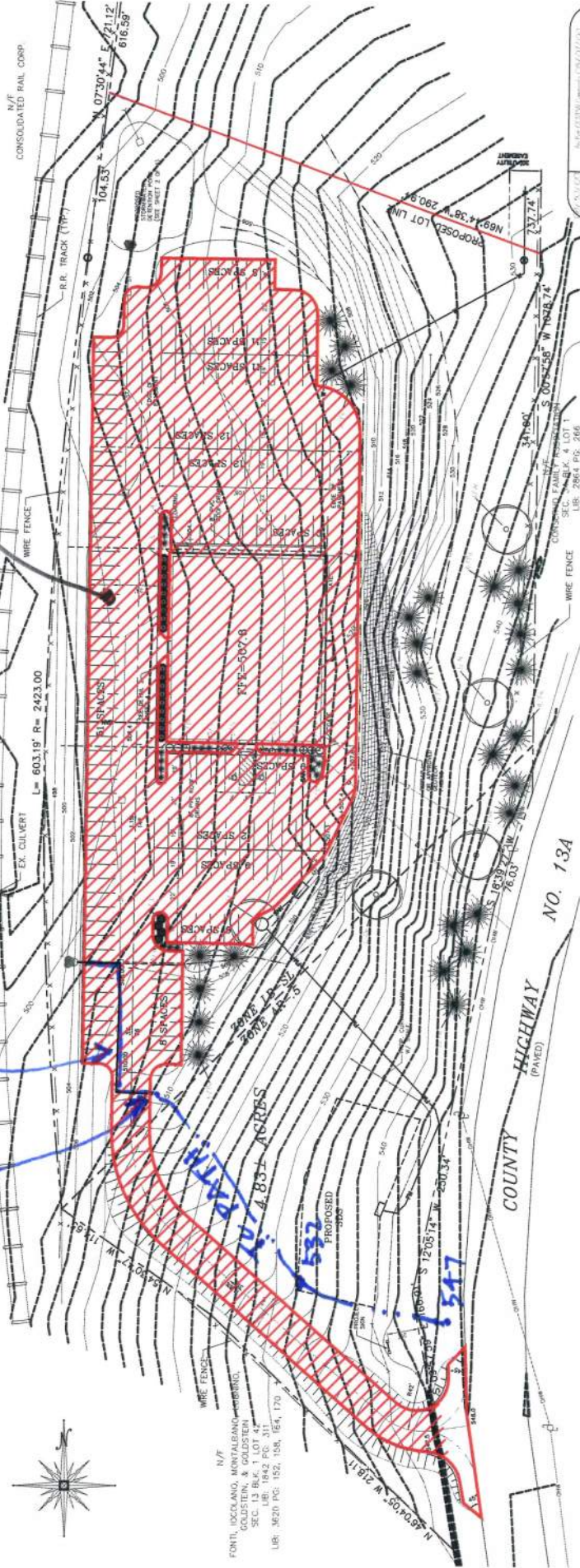
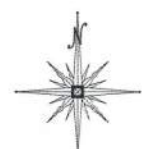


FIGURE 1
1" = 2000'

CB 511.5

PIPE FLOW

IMPERVIOUS AREA



BULK REQUIREMENTS: ZONE LB-SL

TOWN OF CHESTER	
MINIMUM REQUIRED	PROVIDED
LOT AREA (AC.)	10.000 S.F.
LOT WIDTH (FT.)	50
FRONT YARD (FT.)	20
REAR YARD (FT.)	30
ONE SIDE YARD (FT.)	5
BOTH SIDE YARDS (FT.)	10
PARKING: 1/150 S.F. of RETAIL	67 SP.
(10,000 S.F. / 150 S.F.)	158 SP.
BUILDING HEIGHT (FT.)	35
DEVELOPMENT COVERAGE (%)	50
MAXIMUM ALLOWED	PROVIDED
	<35
	<50

RECORD APPLICANT
ANDREA AND WILLIAM JENACK
10 CANTONMENT RD.
CHESTER, NY 10918

RECORD OWNER
JOHN BOKENBURG
P.O. BOX 323
SUGAR LOAF, NY 10981

BULK REQUIREMENTS: ZONE AR-5

TOWN OF CHESTER	
MINIMUM REQUIRED	PROVIDED
LOT AREA (AC.)	80,000 S.F.
LOT WIDTH (FT.)	210,395 S.F.
FRONT YARD (FT.)	>200
REAR YARD (FT.)	>50
ONE SIDE YARD (FT.)	>60
BOTH SIDE YARDS (FT.)	>30
BOTH SIDE YARDS (FT.)	>80
BUILDING HEIGHT (FT.)	35
DEVELOPMENT COVERAGE (%)	10
MAXIMUM ALLOWED	PROVIDED
	<35
	<10

~LEGEND~

- Property Line
- Adjoining Lot Line
- Elevation TO Contour
- Elevation 2 Contour
- Proposed Grading
- Proposed Spot Elevation
- Proposed Swale
- Fence Line
- Utility Pole
- Overhead Utility Line

~Plants Legend~



VICINITY MAP

FIGURE 2
JENACK PLAN
1" = 100'

NOTES:

1. THE ENTRANCE ROAD AND HANDICAPPED SPACES ARE TO BE PAVED AS PART OF THE INIT SITE IMPROVEMENTS.
2. THE PARKING AREA SHALL BE PAVED UP TO THE FRONT OF THE BUILDING (SOUTH END) WITHIN THREE (3) YEARS OF THE CERTIFICATE OF OCCUPANCY, AND THE REMAINING PAVEMENT, AS INDICATED ON THE SITE PLAN, WITHIN FIVE (5) YEARS OF THE CERTIFICATE OF OCCUPANCY.

Esposito & Associates
154 West Main Street
Canton NY 10924
Steven T. Esposito
Landscape Architect
License No. 001699

Jerack Auction House
Town of Chester
500 N. 13th St., 1st Fl.
Canton NY 10924
Grading, Layout and
Landscape Plan

Professional seal of a landscape architect in the State of New York.
I, Steven T. Esposito, a duly Licensed Landscape Architect in the State of New York, do hereby certify that I am the author of the above plan, and that it was prepared by me or under my direct supervision and that I am a duly Licensed Landscape Architect in the State of New York.
Date: 10/1/2018
Signature: [Signature]
Title: Landscape Architect

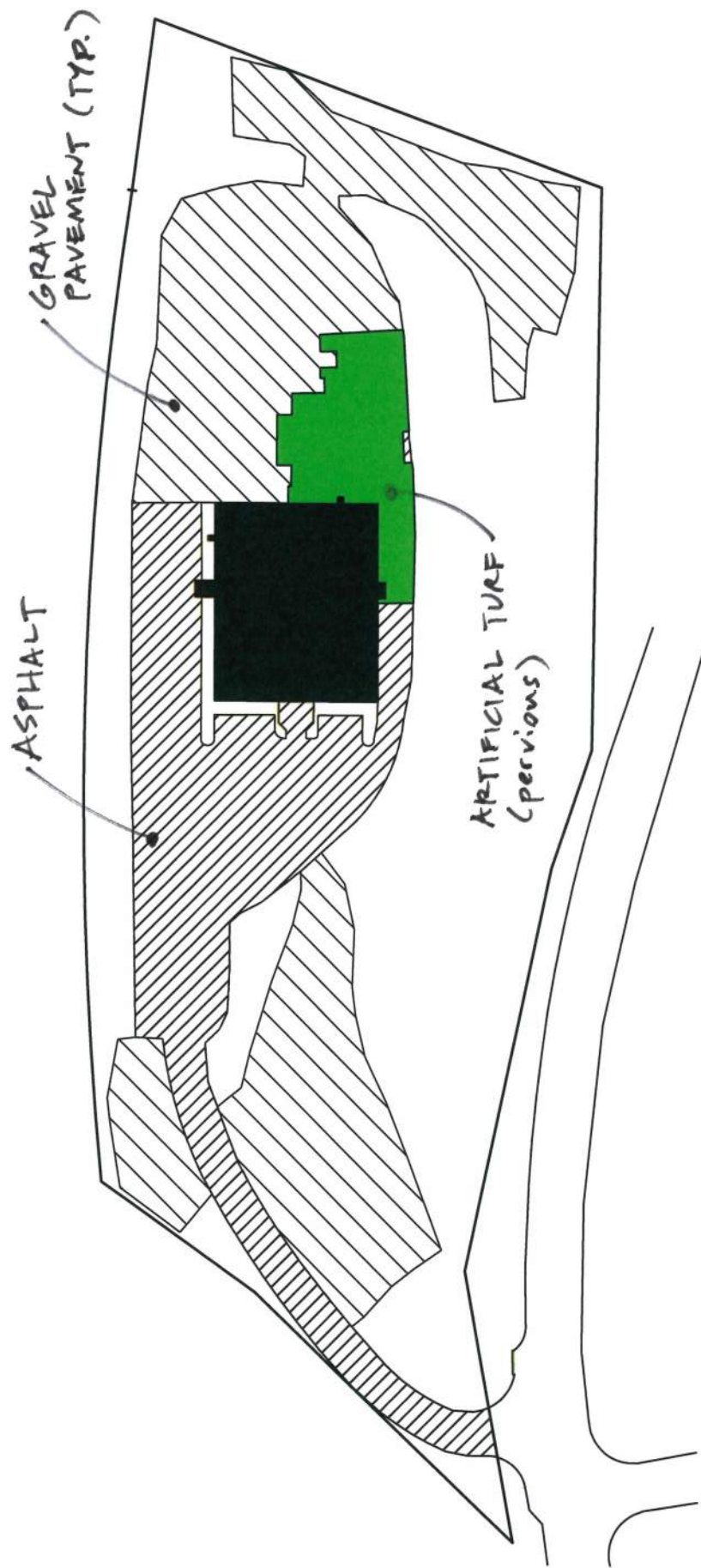


FIGURE 3
TIN BARN PLAN
1" = 100'

Soil Map—Orange County, New York
(Tin Barn)

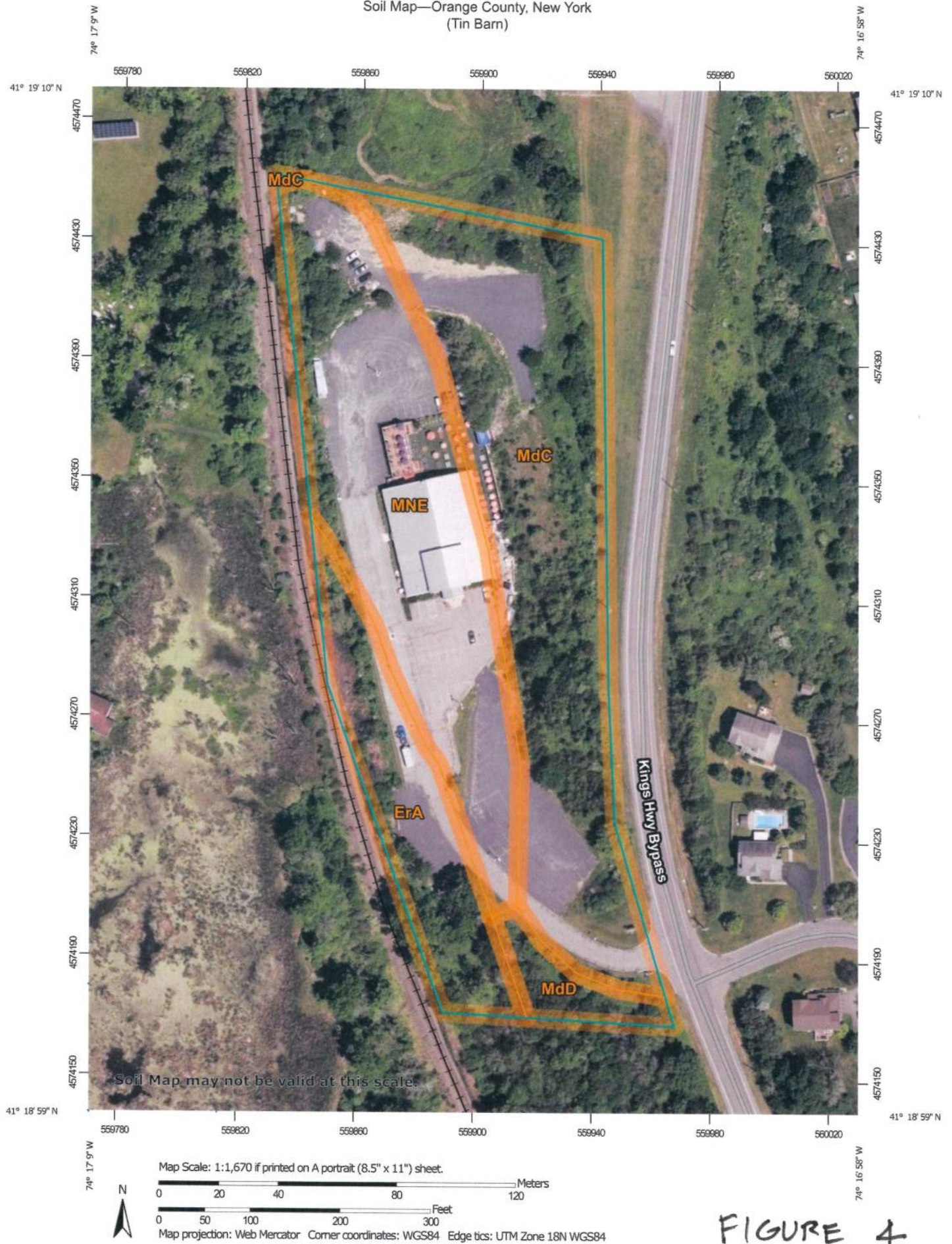


FIGURE 4



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

10/18/2023

TABLE CN-1

10/18/23

CURVE NUMBER CALCULATIONS

PROPOSED CONDITIONS

	Cover: Hyd. Soil Group: CN:	<u>Open space – good</u> <u>D</u> 80	<u>Gravel/pavement</u> <u>C</u> 91	<u>Impervious</u> <u>D</u> 98	Total Area (sf)	Total Area (acres)	Weighted CN
JENACK PLAN	Area in sf:	133,185	0	77,100	210,285	4.83	86.6
TIN BARN PLAN	Area in sf:	105,560	57,735	46,990	210,285	4.83	87.0

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point	
Smoothing	Yes
State	New York
Location	New York, United States
Latitude	41.318 degrees North
Longitude	74.284 degrees West
Elevation	160 feet
Date/Time	Tue Oct 17 2023 09:40:06 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.33	0.51	0.63	0.83	1.03	1.28	1yr	0.89	1.20	1.46	1.80	2.19	2.66	3.07	1yr	2.35	2.95	3.39	4.09	4.73	1yr
2yr	0.40	0.62	0.76	1.00	1.25	1.55	2yr	1.08	1.45	1.77	2.17	2.65	3.22	3.67	2yr	2.85	3.53	4.04	4.76	5.42	2yr
5yr	0.46	0.72	0.90	1.20	1.54	1.94	5yr	1.33	1.79	2.23	2.74	3.34	4.03	4.64	5yr	3.57	4.46	5.09	5.88	6.65	5yr
10yr	0.52	0.81	1.03	1.39	1.81	2.29	10yr	1.56	2.10	2.65	3.26	3.97	4.79	5.54	10yr	4.24	5.33	6.07	6.91	7.77	10yr
25yr	0.60	0.95	1.21	1.68	2.24	2.87	25yr	1.93	2.60	3.32	4.11	5.00	6.02	7.02	25yr	5.33	6.75	7.66	8.55	9.56	25yr
50yr	0.68	1.09	1.40	1.95	2.63	3.40	50yr	2.27	3.06	3.95	4.88	5.95	7.16	8.40	50yr	6.33	8.08	9.13	10.05	11.19	50yr
100yr	0.77	1.24	1.60	2.27	3.09	4.03	100yr	2.67	3.60	4.69	5.82	7.08	8.51	10.06	100yr	7.54	9.67	10.90	11.82	13.11	100yr
200yr	0.87	1.42	1.84	2.64	3.64	4.77	200yr	3.14	4.23	5.58	6.93	8.44	10.14	12.05	200yr	8.97	11.59	13.02	13.90	15.37	200yr
500yr	1.04	1.70	2.22	3.23	4.53	5.98	500yr	3.91	5.25	7.01	8.72	10.64	12.78	15.31	500yr	11.31	14.72	16.47	17.24	18.97	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.30	0.46	0.56	0.76	0.93	1.11	1yr	0.80	1.09	1.23	1.56	2.03	2.28	2.59	1yr	2.02	2.49	2.80	3.81	4.31	1yr
2yr	0.38	0.59	0.72	0.98	1.21	1.45	2yr	1.04	1.42	1.64	2.11	2.62	3.12	3.55	2yr	2.76	3.41	3.91	4.64	5.28	2yr
5yr	0.43	0.66	0.81	1.12	1.42	1.68	5yr	1.23	1.64	1.92	2.46	3.07	3.73	4.29	5yr	3.30	4.13	4.76	5.48	6.23	5yr
10yr	0.47	0.72	0.89	1.24	1.61	1.89	10yr	1.39	1.84	2.15	2.75	3.48	4.26	4.90	10yr	3.77	4.71	5.50	6.21	7.01	10yr
25yr	0.53	0.81	1.01	1.44	1.89	2.18	25yr	1.63	2.13	2.51	3.23	4.07	5.03	5.88	25yr	4.45	5.65	6.65	7.34	8.16	25yr
50yr	0.59	0.89	1.11	1.60	2.15	2.44	50yr	1.85	2.39	2.83	3.65	4.61	5.66	6.77	50yr	5.01	6.51	7.69	8.36	9.20	50yr
100yr	0.65	0.98	1.23	1.78	2.44	2.73	100yr	2.11	2.67	3.19	4.12	5.23	6.36	7.81	100yr	5.63	7.51	8.91	9.50	10.32	100yr
200yr	0.73	1.09	1.39	2.01	2.80	3.06	200yr	2.42	2.99	3.60	4.69	5.95	7.18	9.02	200yr	6.35	8.68	10.35	10.82	11.57	200yr
500yr	0.85	1.26	1.62	2.36	3.35	3.56	500yr	2.89	3.48	4.24	5.58	7.08	8.38	10.94	500yr	7.42	10.52	12.64	12.87	13.52	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.36	0.55	0.68	0.91	1.12	1.35	1yr	0.97	1.32	1.56	1.97	2.42	2.86	3.32	1yr	2.53	3.19	3.67	4.31	5.10	1yr
2yr	0.41	0.63	0.78	1.05	1.30	1.55	2yr	1.12	1.52	1.77	2.26	2.80	3.36	3.82	2yr	2.97	3.67	4.22	4.93	5.65	2yr
5yr	0.50	0.78	0.96	1.32	1.68	1.99	5yr	1.45	1.95	2.27	2.91	3.63	4.36	4.95	5yr	3.86	4.76	5.45	6.30	7.08	5yr
10yr	0.59	0.91	1.13	1.58	2.04	2.44	10yr	1.76	2.39	2.76	3.55	4.44	5.37	6.14	10yr	4.75	5.91	6.67	7.58	8.47	10yr
25yr	0.75	1.13	1.41	2.02	2.65	3.19	25yr	2.29	3.12	3.62	4.65	5.78	7.08	8.06	25yr	6.26	7.75	8.71	9.70	10.78	25yr
50yr	0.88	1.34	1.67	2.41	3.24	3.81	50yr	2.80	3.73	4.42	5.68	7.05	8.76	9.91	50yr	7.75	9.53	10.65	11.70	12.94	50yr
100yr	1.05	1.59	1.99	2.87	3.94	4.65	100yr	3.40	4.54	5.39	6.93	8.60	10.85	12.19	100yr	9.60	11.72	13.03	14.11	15.56	100yr
200yr	1.25	1.88	2.38	3.44	4.80	5.67	200yr	4.14	5.54	6.58	8.46	10.49	13.48	15.00	200yr	11.93	14.42	15.95	17.01	18.73	200yr
500yr	1.58	2.34	3.02	4.38	6.23	7.36	500yr	5.38	7.20	8.57	11.02	13.63	17.96	19.69	500yr	15.89	18.93	20.82	21.80	23.96	500yr

Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description		Curve numbers for hydrologic soil group			
Cover type and hydrologic condition	Average percent impervious area ^{2/}	A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
<i>Developing urban areas</i>					
Newly graded areas					
(pervious areas only, no vegetation) ^{5/}		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

¹ Average runoff condition, and $I_a = 0.2S$.² The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.³ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.⁴ Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.⁵ Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Hydrograph Report

2

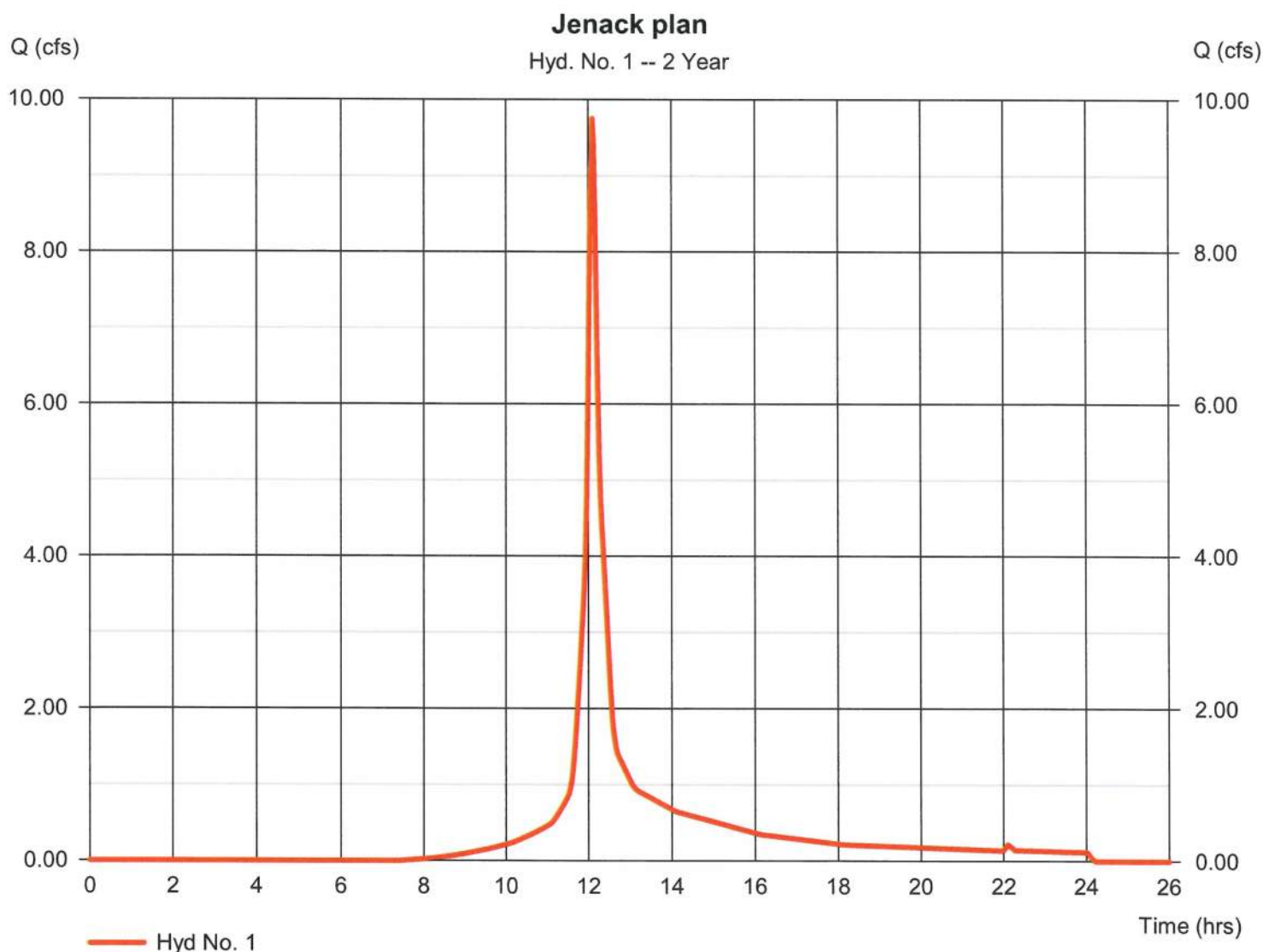
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Oct 17, 2023

Hyd. No. 1

Jenack plan

Hydrograph type	= SCS Runoff	Peak discharge	= 9.752 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 33,317 cuft
Drainage area	= 4.830 ac	Curve number	= 86.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.00 min
Total precip.	= 3.22 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Hyd. No. 1

Jenack plan

Description	A	B	C	Totals
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Sheet Flow

Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.21	0.00	0.00	
Land slope (%)	= 15.00	0.00	0.00	

Travel Time (min)	= 6.36	+	0.00	+	0.00	=	6.36
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Shallow Concentrated Flow

Flow length (ft)	= 150.00	0.00	0.00	
Watercourse slope (%)	= 13.70	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=5.97	0.00	0.00	

Travel Time (min)	= 0.42	+	0.00	+	0.00	=	0.42
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Channel Flow

X sectional flow area (sqft)	= 0.61	0.88	0.00	
Wetted perimeter (ft)	= 1.96	2.36	0.00	
Channel slope (%)	= 5.30	1.30	0.00	
Manning's n-value	= 0.012	0.012	0.015	
Velocity (ft/s)	=13.08	7.31	0.00	

Flow length (ft)	((0})95.0	35.0	0.0	
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Travel Time (min)	= 0.12	+	0.08	+	0.00	=	0.20
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Total Travel Time, Tc	7.00 min
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Hydrograph Report

4

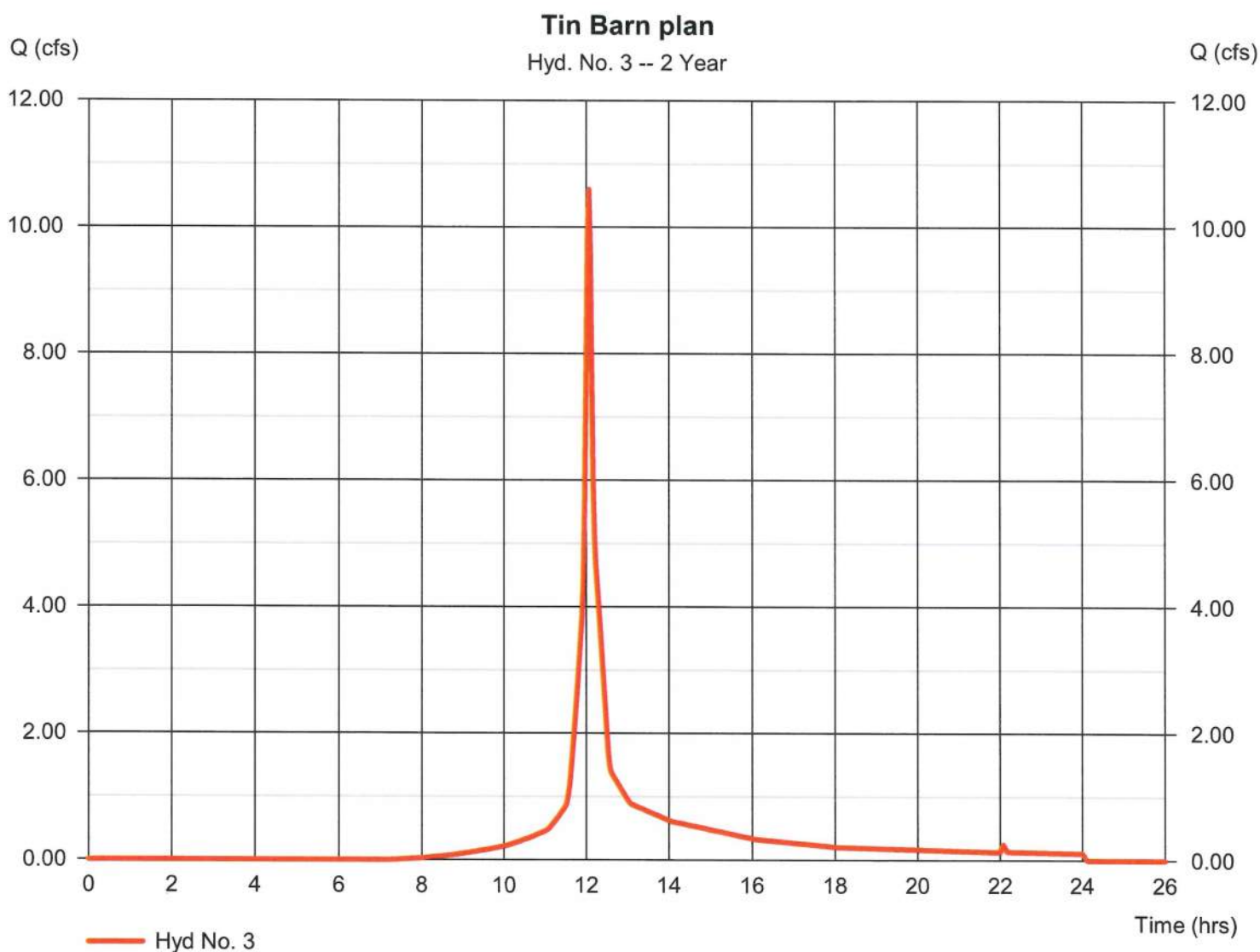
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Oct 17, 2023

Hyd. No. 3

Tin Barn plan

Hydrograph type	= SCS Runoff	Peak discharge	= 10.60 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 31,766 cuft
Drainage area	= 4.830 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.60 min
Total precip.	= 3.22 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hyd. No. 3

Tin Barn plan

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.240	0.030	0.011	
Flow length (ft)	= 60.0	40.0	0.0	
Two-year 24-hr precip. (in)	= 3.22	3.22	0.00	
Land slope (%)	= 27.50	8.80	0.00	
Travel Time (min)	= 3.31	+	0.72	+
			0.00	= 4.03
Shallow Concentrated Flow				
Flow length (ft)	= 150.00	0.00	0.00	
Watercourse slope (%)	= 10.30	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	=6.52	0.00	0.00	
Travel Time (min)	= 0.38	+	0.00	+
			0.00	= 0.38
Channel Flow				
X sectional flow area (sqft)	= 0.61	0.88	0.00	
Wetted perimeter (ft)	= 1.96	2.36	0.00	
Channel slope (%)	= 5.30	1.30	0.00	
Manning's n-value	= 0.012	0.012	0.015	
Velocity (ft/s)	=13.08	7.31	0.00	
Flow length (ft)	95.0	35.0	0.0	
Travel Time (min)	= 0.12	+	0.08	+
			0.00	= 0.20
Total Travel Time, Tc				4.60 min

Hydrograph Report

6

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

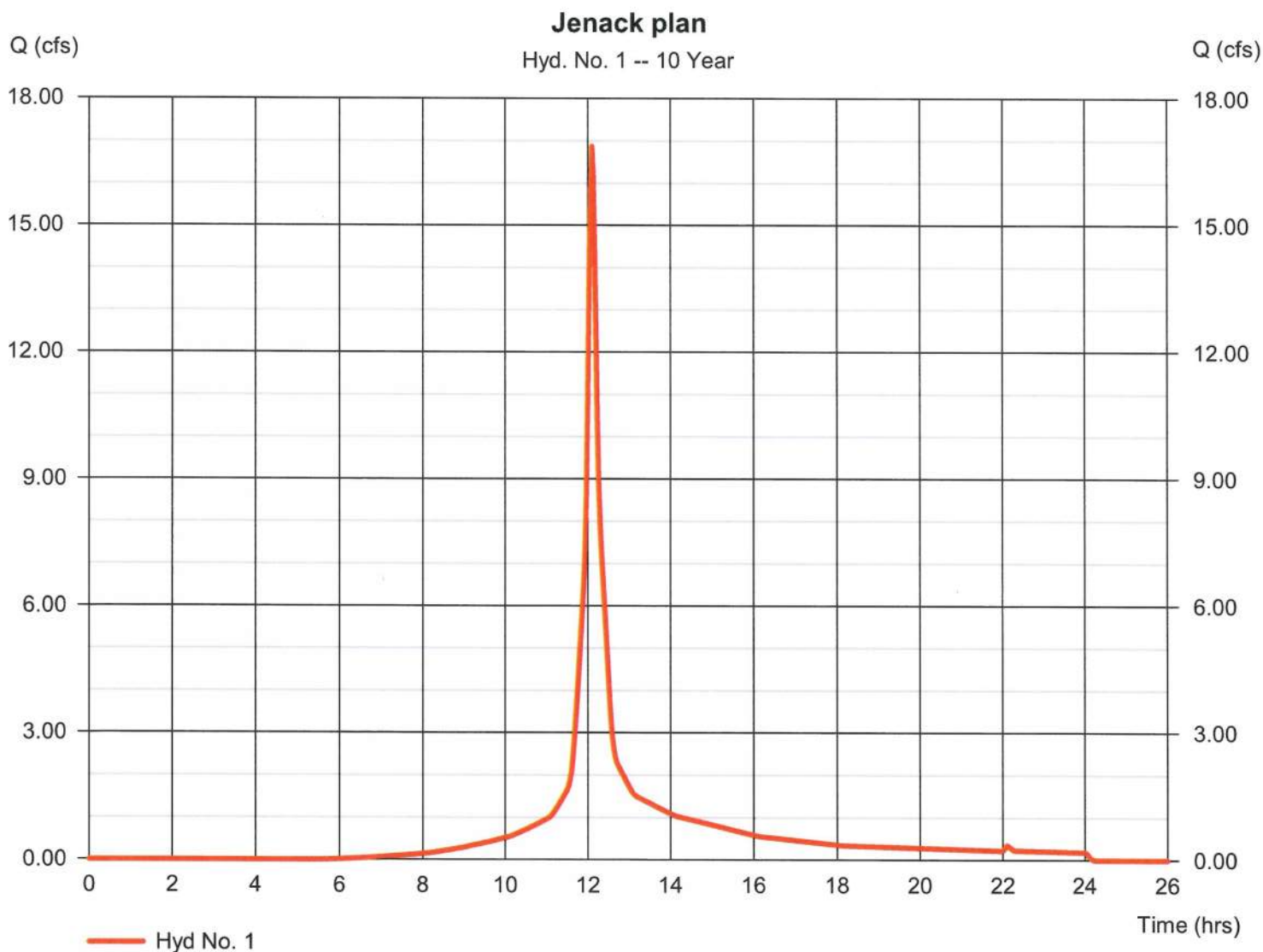
Tuesday, Oct 17, 2023

Hyd. No. 1

Jenack plan

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 2 min
Drainage area = 4.830 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 4.79 in
Storm duration = 24 hrs

Peak discharge = 16.87 cfs
Time to peak = 12.10 hrs
Hyd. volume = 58,391 cuft
Curve number = 86.6
Hydraulic length = 0 ft
Time of conc. (Tc) = 7.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

7

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Oct 17, 2023

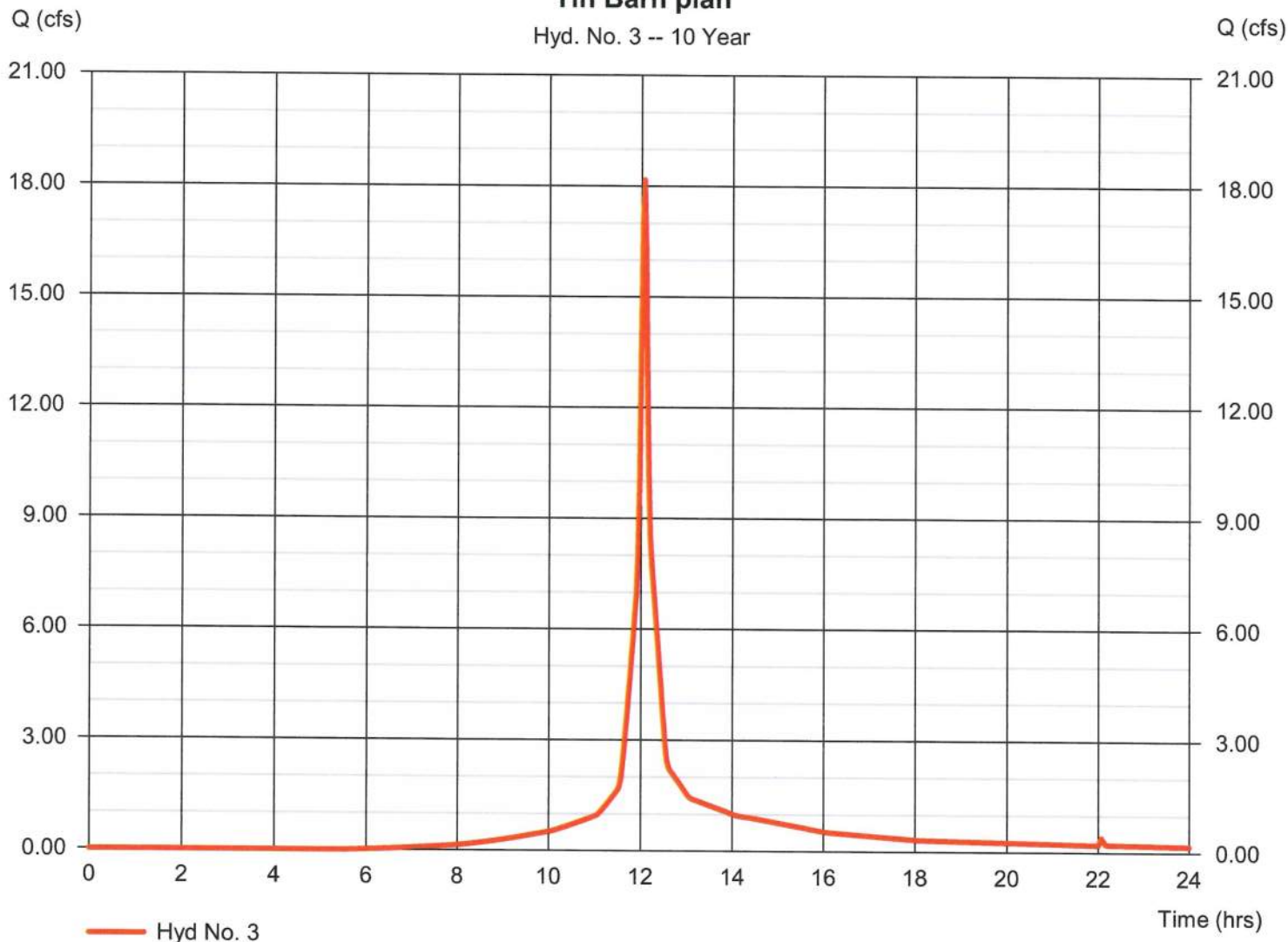
Hyd. No. 3

Tin Barn plan

Hydrograph type	= SCS Runoff	Peak discharge	= 18.18 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 55,392 cuft
Drainage area	= 4.830 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.60 min
Total precip.	= 4.79 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Tin Barn plan

Hyd. No. 3 -- 10 Year



Hydrograph Report

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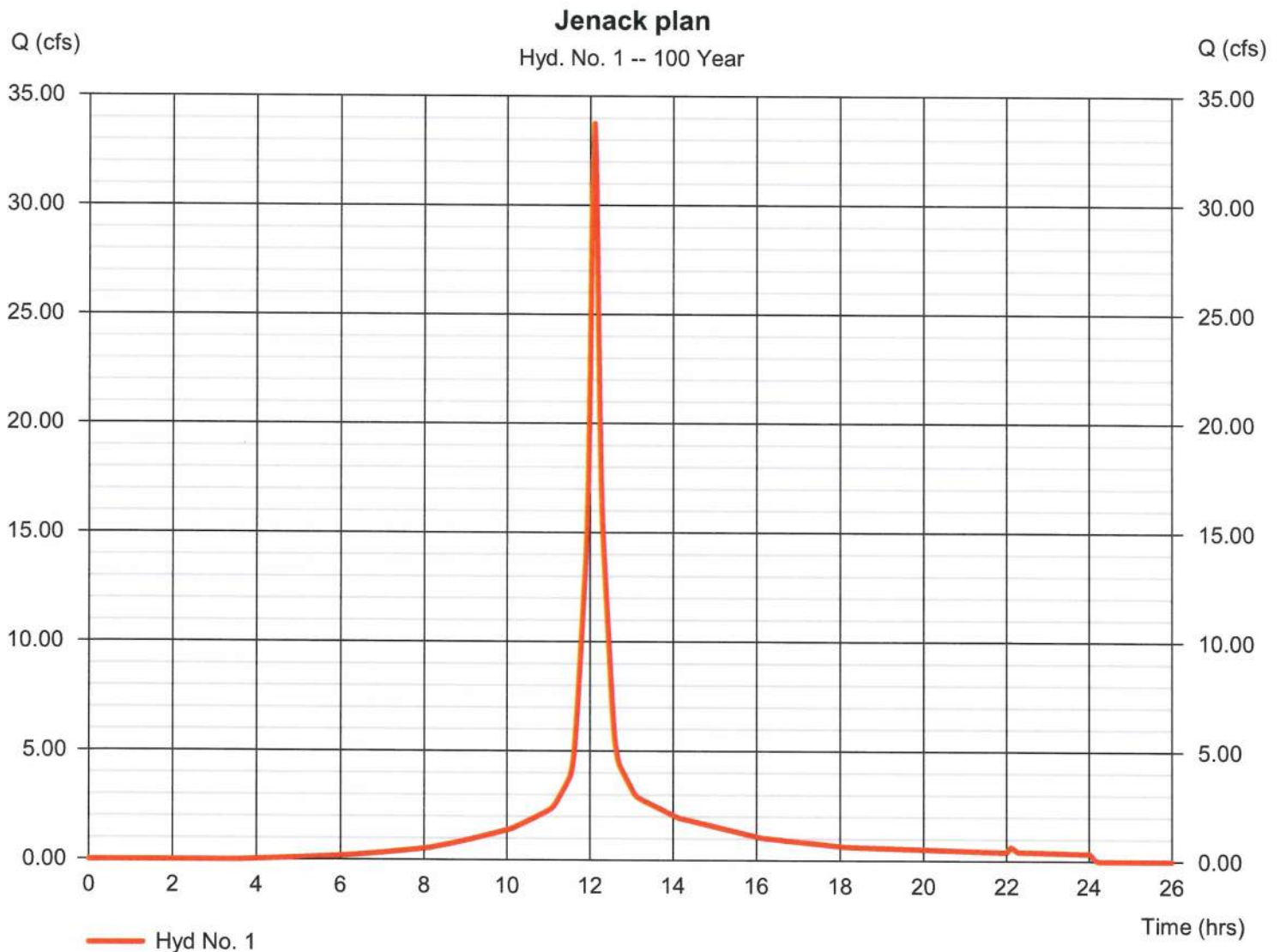
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Oct 17, 2023

Hyd. No. 1

Jenack plan

Hydrograph type	= SCS Runoff	Peak discharge	= 33.76 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 120,956 cuft
Drainage area	= 4.830 ac	Curve number	= 86.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.00 min
Total precip.	= 8.51 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

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Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Oct 17, 2023

Hyd. No. 3

Tin Barn plan

Hydrograph type	= SCS Runoff	Peak discharge	= 36.08 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 114,188 cuft
Drainage area	= 4.830 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.60 min
Total precip.	= 8.51 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

